by reaction in more than half the roots, and relaxation index by reaction in fewer than half. The accompanying table from the article summarizes the results:

	Presentation time	Critical time	Reaction time	Relaxation index
Lepidium sativum at 17–18C.	5.5 min.	6 min.	25.5 min.	30
" " at 25–27C.	1.5 "	2 "	12.5 "	40
Lupinus albus at 17–18C.	8.5 "	11 "	46.5 "	20
" " at 25–27C.	2.0 "	7 "	33.0 "	25

One is struck here by the time demanded for relaxation from an exposure; it is very much greater than reported by FITTING. The author attempted, without full success, to develop a formula by which any one of the critical periods can be calculated from the other three.—WILLIAM CROCKER.

Photosynthesis.—LUBIMENKO[14] finds that there is a light optimum for the production of dry substance by green plants. The absolute value of this optimum is less than that by which the chlorophyll apparatus is able to furnish the maximum of photochemical work expressed in the decomposition of CO_2. By means of monochromatic filters and gasometric determinations, a comparison is made of the action of the different colored rays on the decomposition of CO_2. These results are compared with the action of the same rays on the production of total dry weight. The energy for CO_2 decomposition in colored light depends upon the absorption of the various colored rays by the chloroplasts as well as on their caloric energy. The author objects to the method employed by KNIEP and MINDER and others in determining the influence of different colored rays on CO_2 assimilation, on the ground that they measured the quantity of light falling upon the leaf and not that absorbed by the chloroplasts. The real carbon fixation expressed by the increase in dry weight is influenced unequally by the different colored rays. The maximum increase in dry weight occurs under the action of the blue-violet rays. The yellow-orange rays are inferior to the red rays, and the minimum occurs in the green rays. It is necessary to assume two successive stages in the photosynthetic process. The first is characterized by the decomposition of CO_2 and synthesis of the first organic product. In this stage of the process the plant utilizes predominantly the energy of the red rays of the solar spectrum. The second stage is characterized by the definitive fixation of the first organic product, and the plant employs for this work especially the blue-violet rays.—CHAS. O. APPLEMAN.

[14] LUBIMENKO, M. W., L'assimilation chlorophyllienne et la production de substance seche à la lumière blanche et à la lumière colorée. Rev. Gén. Bot. **23**: 1–14. 1911.